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MIGRATION AT THE SPURN LIGHTHOUSE IN 1896.

By JOHN CORDEAUX, F.R.G.S., M.B.O.U.

THE new lighthouse on the Spurn, which was lighted for the first time on the night of September 12th and 13th, 1895, throws a beam equal to 80,000 candles in fine, and 100,000 in stormy weather. The light is visible twenty to thirty miles at sea under favourable conditions of the atmosphere. I am indebted, through Dr. Hewetson, of Leeds, to Mr. W. Y. Counter, one of the light-keepers, for the following record of birds which struck the lantern in 1896.

JANUARY.

3rd.—A large number of small birds flying round the lantern; three or four Larks caught. Weather foggy with southerly light airs.

14th.—One Golden Plover and several Knots struck the lantern and killed between two and six o'clock a.m. The weather very clear but dark with a drizzling rain and a moderate breeze from S. and S.E.

FEBRUARY.

7th.—One Knot killed. Weather foggy; wind W.S.W.

13th.—Caught a Snow Bunting against lantern. Overcast and dark; wind light W.

15th.—One cock Blackbird and twelve Starlings. Overcast, but clear; wind E.

MARCH.

7th.—Many Starlings flying round the light, two caught. Wind S., fog and drizzle.

8th.—Many small birds about lantern. One Starling and a Lark caught. Cloudy, but clear; wind N.W.

9th.—Between one to five a.m. several Starlings flying about lantern, one caught. Misty; wind N.W.

10th.—An immense number of Starlings around the light all night, also a flock of Lapwings, Golden Plovers, and Stints. Six dozen Starlings, two Lapwings, two Stints, and one Blackbird captured against lantern, and about four dozen Starlings found in the morning, at the base of the tower, dead. Wind S.W., dark, with showers. I have noticed we always get more birds when the wind is off the Lincolnshire coast, than when it blows in any other direction.

11th.—A few Starlings round lantern; one Blackbird caught.

16th.—Several birds striking the lantern between one and four a.m. Wind S.W., dark night. Caught four Starlings, two Blackbirds, and one Fieldfare.

18th.—Several birds struck between one and four a.m. Wind N.W. and dark night. Six Starlings and one Fieldfare caught.

APRIL.

1st.—3.45 a.m., Water Rail struck and was killed, breaking its leg. Wind W.N.W., slightly overcast, with drizzling rain.

JULY.

29th.—A Swift roosting in one of the tower windows.

AUGUST.

9th.—A Lesser Tern killed against lantern at two a.m. Wind N.E., overcast and clear.

13th.—Carrier Pigeon caught and released at daylight. A Snipe roosting on the gallery.

SEPTEMBER.

2nd.—Oystercatcher killed against light, many flying round; also many small birds. S.W. wind and a dark night.

4th.—During the small hours of the morning two Wheatears and a Tern killed against lantern, and one Wheatear caught. Wind E., rain, very dark.

OCTOBER.

7th.—Large flocks of Knots to the south; one killed against lantern.

10th.—Flocks of Knots to the south.

11th.—Ring Ouzel and two Redwings caught against lantern.

13th.—Several Starlings, Chaffinches, and Snow Buntings. Five Starlings and three Larks captured.

15th.—First appearance of the Woodcock. Snipe killed against light.

17th.—Hundreds of birds around lantern from one to five a.m. Wind N.E. and drizzling rain. Nine dozen captured, including Lapwings, Ring Ouzels, Fieldfares, Starlings, Blackbirds, Redwings, and Chaffinches. Several Woodcocks shot on dunes in the morning. At 10.45 p.m. a Golden-crested Wren flew against lantern.

NOVEMBER.

7th.—Large numbers of birds about lantern from seven to nine p.m.—Curlews, Golden Plovers, Oystercatchers, and Larks. Seven Larks and one Golden Plover caught. Wind W., thick, rain.

13th.—4 a.m., two Blackbirds, two Starlings, and one Knot killed against lantern.

19th.—A large number of birds were flying about the light from dark to dawn of the 20th. Wind S.E., strong (6), overcast, misty and drizzling rain (O.M.R.). Caught four Lapwings, one Golden Plover, ten Starlings, and two Stints; a great number also were picked up at foot of tower, killed after striking lantern.

20th.—Flock of Lapwings flying round lantern, but none struck. Weather overcast; S.E., moderate gale (7).

29th.—A Golden Plover killed at 2 a.m. Wind S.E. fresh (5), overcast, misty and rain.

DECEMBER.

11th.—A large number of Knots flying round all night to daylight of the 12th. Wind S.W., gentle breeze (3), overcast, misty and rain, fog at times. Caught two Knots; one Dunlin killed against lantern.

12th.—At 4.30 a.m. a large bird struck the lantern and fell with a heavy thud to the ground; it was found dead in the morning some distance from the tower, and proved to be a Coot. Wind S.W., gentle breeze (3), fog. A female Wigeon was also picked up at foot of tower.

18th.—4 a.m. Titlark caught against lantern. Wind E. light (2), overcast but clear.

STONE CURLEWS AS OBSERVED AROUND THETFORD.

By W. G. Clarke.

The first Stone Curlew graphically described to British ornithologists was a specimen killed near Thetford in 1674, a drawing of which was forwarded to Ray by Sir Thomas Browne of Norwich. Since that time the "breck" district of Norfolk and Suffolk, of which Thetford is the centre, has been known as the great stronghold of this bird in Britain. Although the number of Stone Curlews breeding in the district has doubtless greatly diminished since that period, it still seems probable that the numerical loss has been little since the time of Salmon in the early thirties. This year they are certainly far more plentiful than they have been during the last ten years. A belt of heath-land from four to eight miles wide surrounds Thetford—which for this reason has been designated "the town on the heath"—and hereon the Stone Curlews nest yearly.

J. D. Salmon, F.L.S., recorded the first arrivals of the bird in the district as on March 27th, 1834; March 15th, 1835; and March 28th, 1836. My own dates are April 2nd, 1892; March 31st, 1893; March 28th, 1894; March 31st, 1895; and March 24th, 1897. This year, however, they were noted by a very accurate observer at Great Fakenham, Suffolk, during the last week of February. The main body has generally departed by the middle of October, but Salmon started one on December 9th, 1834, and on December 12th, 1894, I distinctly heard one whistling almost incessantly for fifteen minutes from Barnham Cross Common, a mile from Thetford. A pair were also observed here in March, 1853, during deep snow.

On March 25th last, the day after their arrival in the district, these birds seemed to be extremely plentiful upon the heaths and upland "brecks" north and west of Thetford. Their whistling was almost continuous, albeit blurred, as it always is

for a few weeks after their arrival. During this period, too, they seem to frequent the uplands by night in preference to the river-side marshland, their querulous notes sounding from all quarters. After this period, when the duties of nidification are in full swing, these birds may be seen following their accustomed lines of flight from the heaths to the river side, generally about two hours after sunset. Stevenson was unable to determine what amount of truth there was in this nocturnal "flighting" to the alluvium, but it is an undoubted habit in this district. Although the Stone Curlew is a bird of extreme wariness, it is possible on Thetford Warren to get within ten yards of flocks numbering from twelve to twenty in the months of May and June. In the 'Fauna of Norfolk,' Lubbock says that they were sometimes observed in flocks of from eighty to a hundred prior to their autumnal migration, but personally I have never seen a flock containing more than twenty-five. This may possibly be accounted for by the fact that, whereas in Lubbock's time the country was practically bare, and formed one vast heath, now, by the extensive planting of quick-growing trees, numerous plantations divide the heathland into sections, and it may be that only the birds of these smaller sections at present collect together, where of yore their area was much more extended. These flocks may be seen and heard together in the daytime, but after dark one never hears more than a pair calling together from any one quarter. A commonly accepted idea is that the Stone Curlew is disinclined to utter its note during the day, but is with regard to whistling essentially a bird of the night. In this district they always when disturbed,—whatever the hour of the day,—fly off whistling. Another curious fact may be noticed during a shower of rain in summer. A few minutes after the commencement of the downfall the majority of the Curlews fly down from the upland heaths to the nearest water, where I presume the rain has the effect of driving their food out of its haunts, thus enabling them to more easily capture it. From Knettishall and Stonehouse Heaths, and Thetford Warren and Abbey Heath, these birds fly down to the Little Ouse river, but on the heaths north of Thetford—Roudham, Bridgham, Wretham and Croxton—the Curlews invariably fly towards the meres, which are small sheets of water situated in the wildest portion of the Norfolk heathland. This, however, is more noticeable late in the season, in August and September, when they may find greater difficulty in always

obtaining a sufficient food-supply by night. Each individual seems to whistle its loudest during this day-time flight to the feeding-grounds.

Their whistle has several variations soon after their arrival. Until May it is blurred, and often consists merely of a hoarse chuckle incessantly repeated for a short time. But about the first week in May their note is "curlew"; first short and indistinct, and then shrill and continued, the first short note being gradually dropped until only the full note remains. It has been suggested that their whistling by night is a call to inform one another of their whereabouts during cloudy weather. My own experience is that they are incomparably more noisy on moonlight nights than when the sky is overcast, and that therefore this reason is not the correct one. In this district the brood is generally hatched off by the commencement of June; but so well do the colourings of the young birds harmonise with those of the heathland that it is a matter of extreme difficulty to detect them. The eggs are usually laid in a slight hollow, sometimes on the open heath, but more generally on the upland "brecks." There is no material for the nest save a few of the previous year's dried bracken fronds, and search how one will, it is practically only by accident that the two eggs can be found. After the young ones are hatched it seems to be their rule to take care of themselves on the approach of danger; their parents doing likewise. It is at this time that one or other of the parent birds may occasionally be seen with head and neck extended, as in the beautiful life-group in the British Museum of Natural History. A remarkable fact of the authenticity of this nest and its surroundings struck me as a prehistoric archæologist. On the slab of heathland turf is a prehistoric flint flake, such as one may find on any of the local heaths. Locally the Stone Curlew is generally called the "Cullew," but is occasionally termed the "Sandpiper" or "Willie Reeve."

What effect the planting previously mentioned may have upon the Stone Curlew cannot yet be determined; but certainly the more heathland there is covered with trees the more circumscribed must their haunts be in future. One cannot but hope that this characteristic breckland bird, with its once-heard but never-forgotten whistle, will long continue to occupy the haunts of its extinct companion, the Great Bustard.

FOREIGN FINCHES IN CONFINEMENT,

WITH HINTS AS TO THE DIFFICULTIES ARISING FROM THE ASSOCIATION OF VARIOUS SPECIES IN THE SAME AVIARY.

By Arthur G. Butler, Ph.D., F.L.S., F.Z.S., &c.

For many years before I ventured to arrange for the publication of my 'Foreign Finches in Captivity,' I had kept and studied a considerable number of species of both the *Fringillidæ* and *Ploceidæ;* but thoroughly to comprehend the peculiar dispositions of these birds is the work of a lifetime, perhaps of several generations of lifetimes.

The first aim of the aviculturist is so to group the species that they may dwell harmoniously together, but with certain birds this is practically impossible, as I shall now proceed to explain.

The genus *Spermophila* was considered by my friend Herr August Wiener to consist of uninteresting but perfectly harmless birds which were content to pass an uneventful existence in munching millet-seed. I find the species of this genus very interesting, the whole of them fair, and some excellent, songsters. Most of them are innocent enough, but one—the White-throated Finch, *Spermophila albigularis*—is a perfect little demon. I have kept the White-throated Finch for nine or ten years. For the first year, in a large aviary, he is on his good behaviour, and sings his pretty see-saw song almost incessantly; the aviculturist is charmed, and buys two or three more males, and perhaps a female or two. From that day there is incessant war in the aviary; the males fight from dawn to twilight. If only two equally powerful males are together the fighting does little harm, but when there are three the weakest goes to the wall, is literally scalped, and unless promptly removed is certain to be torn to shreds.

When I had got as far as this in my study of *S. albigularis*, I thought I had plumbed the depth of its iniquity; so, never having seen it attack anything but a *Spermophila*, I purchased a

pair, and turned them out in a large cool aviary with about fifty small birds of various kinds. During the whole of 1896 *S. albigularis*, with the exception of occasional wordy disputes with *S. gutturalis*, was a pattern of amiability; but from the beginning of April, 1897, he began to show his true character, disputing incessantly with my Goldfinches, one of which he would have murdered had I not fortunately come upon the scene just as he commenced to tear at the feathers on its forehead, making it scream with fright and pain. Within a fortnight from that date it had killed two Amaduvade Waxbills, *Sporæginthus amandava*; one Green Amaduvade, *Stictospiza formosa*; and four Zebra-finches, *Tæniopygia castanotis*, one of these being a young bird only two days out of the nest, the other three adults which were breeding. The last victim had the skull entirely bared, the eyes pecked out, the neck reduced to a mere thread, the base of the wing cleared of coverts and quite raw, and the whole of one side of the breast raw and bare of skin. I have removed that White-throated Finch to an aviary where he will have the society of birds twice his own size, chiefly African Weavers (*Pyromelana*, *Quelea*, &c.).

The history of the Green Singing-finch, *Serinus icterus*, is similar, only it is rarely aggressive excepting in the breeding season, when it fiercely attacks other Serins, Goldfinches, &c. Canaries have no chance against it; they are hunted down, and the skin almost instantly torn back from the base of the beak.

Of course many of the true *Fringillidæ*, such as the species of *Sycalis* and *Paroaria*, are well known to be dangerous associates for smaller and weaker birds; but, until 1896, I was not aware that *Sycalis flaveola*, savage and pugnaceous as it always is towards males of its species, was capable of murdering its own mate. However, after breeding from a pair in a large flight-cage for several years, the hen refused to continue to accept her husband's attentions; whereupon he knocked her down, grasped her firmly, tore off her scalp, and temporarily blinded her. Hearing the screams of the wounded bird, I took her out, applied vaseline to her wounds, and caged her separately; in a fortnight she recovered her sight, but at the end of a month I found her dead.

Among the smaller *Ploceidæ* there are a few very spiteful birds,

notably the Parson-finch, *Poephila fasciata*, and the Ribbon-finch, *Amadina fasciata*, the former being more than a match for the latter; for I had a hen Ribbon-finch killed by a cock Parson-finch two or three years ago. Yet individual males of *P. fasciata* have lived with other small finches for many years on amicable terms, only proving dangerous from the fact that they will pair with any of the tiny Grass-finches, not a few of which consequently die through egg-binding.

With nine good-sized aviaries at my disposal, I find no little difficulty in so sorting out my many birds as to avoid risk to life and limb, and I find the best plan is to mix the various Orders as much as possible. Thus in one aviary I keep the larger Doves, some Chinese Quails, a Yellow Wagtail, a Stonechat, a Paradise Whydah, a Canary or two, and a pair of Parson-finches; the Doves quarrel a little, but otherwise everything goes on smoothly. In another aviary I keep many small finches, both British and foreign, two pairs of Diamond Doves, a Redstart, and a Garden Warbler; and so on.

It has been stated that insectivorous birds and seed-eaters should not be kept together; but, when we consider that most finches are insectivorous, and most of our British insectivorous birds thrive on a partial seed diet, the objection ceases to have any weight. I have seen the American Blue-bird, the English Starling, the Robin, Redstart, and many other insectivorous birds swallow quantities of seed, and benefit greatly in consequence. When finches are breeding, soft food in the aviary becomes a necessity for most of them, and the pan put in for the insectivorous birds is largely resorted to. I have reared many broods of Java Sparrows, Saffron-finches, Zebra-finches, Ribbon-finches, and even a Rosa's Parrakeet, all of which were fed by their parents upon regurgitated food put into the aviaries for my insectivorous birds.

ORNITHOLOGICAL NOTES FROM CORSICA.

By Herbert C. Playne (Clifton College).

The days from the 10th to the 21st of April I spent in Corsica, walking from Ajaccio across the island over some high mountains to the east coast, where there is a tract of flat country, and then back again into the mountains to Corte. In some parts birds were very abundant, and the following is a list of the species I was able to identify. The birds were not so forward with their nesting as I had expected, and I found no nests at all containing eggs, though there were a good many nearly ready for them.

It is a land of Goldfinches and Serins, and Cirl Buntings too are very numerous.

Missel Thrush, *Turdus viscivorus*.—A few fairly high up in the mountains.

Blackbird, *T. merula*.—Fairly common.

Blue Rock Thrush, *Monticola cyanus*.—I saw a few among the mountains. The cock sings from the top of a rock, and then flies up in the air and descends, still singing, to another rock. I saw one descend in this way some distance down the mountain side.

Wheatear, *Saxicola œnanthe*.—One near the top of the mountains by Corte, and others by the sea-shore near Ajaccio.

Whinchat, *Pratincola rubetra*.—I saw one near Corte on April 20th.

Stonechat, *P. rubicola*.—Abundant.

Redstart, *Ruticilla phœnicurus*.—I saw a few only.

Redbreast, *Erithacus rubecula*.—Fairly common.

Nightingale, *Daulias luscinia*.—There were a few near the east coast, and near Ajaccio.

Sardinian Warbler, *Sylvia melanocephala*.—Abundant on the lower mountain slopes. His song seems to vary a good deal, and he has a rattling alarm-note. I found two nests, much like those of the Blackcap, not quite ready for eggs.

Blackcap, *S. atricapilla.*—Numerous.

Marmora's Warbler, *Melizophilus sardus.*—Very abundant on the mountain slopes; I tried for some time to find a nest, but unsuccessfully.

Fire-crested Wren, *Regulus ignicapillus.*—I saw several among the ilex trees on the mountains.

Willow Wren, *Phylloscopus trochilus.*—I found only one at Corte, and a few at Ajaccio.

Wood Wren, *P. sibilatrix.*—There were a few among the olive trees at Ajaccio.

Cetti's Warbler, *Cettia cettii.*—Abundant among the thick bushes on the lower ground. The cock frequently sings a few loud notes, and can be seen without much difficulty as he moves restlessly about the undergrowth. The hen keeps very quiet, and is not easy to find, but now and then she utters a rapid rattling call to the cock. After watching for some time I found a nest nearly ready for eggs on April 15th. It was placed about three feet from the ground among the dead stalks of a bramble-bush, and was substantially built of dry grass of the same colour, so that it was not easy to see at first. It was well lined with bits of wool and feathers.

Dipper, *Cinclus aquaticus.*—To be seen by the mountain streams.

Long-tailed Tit, *Acredula caudata.*—Fairly abundant.

Great Tit, *Parus major.*—Common.

Coal Tit, *P. ater.*—I only found it among the pines in the mountains.

Blue Tit, *P. cæruleus.*—Common.

Wren, *Troglodytes parvulus.*—Fairly abundant.

White Wagtail, *Motacilla alba.*—I only saw very few.

Grey Wagtail, *M. melanope.*—I saw several by the mountain streams.

Meadow Pipit, *Anthus pratensis.*—Fairly common in suitable places.

Woodchat Shrike, *Lanius pomeranus.*—I came upon a party of cock birds on April 15th near the east coast. They were flying about together and singing often, and were probably, I think, on migration. I saw several more after this day in other parts of the island.

Pied Flycatcher, *Muscicapa atricapilla*.—I saw two among the olive trees near Ajaccio.

Swallow, *Hirundo rustica*; House Martin, *Chelidon urbica*.—Common.

Crag Martin, *Cotile rupestris*.—On two occasions, when high up in the mountains, I had glimpses of birds which I feel sure must have been of this species.

Goldfinch, *Carduelis elegans*.—Very common in the lower parts of the island. They were in flocks, as though they had not paired. I one day saw more than twelve bathing together in a stream—a most beautiful sight.

Serin Finch, *Serinus hortulanus*.—These birds were as abundant in the higher ground as the Goldfinches were in the lower. They too were in flocks, singing and calling to each other all over the mountain slopes. The yellow rump is conspicuous when the bird is flying.

Greenfinch, *Ligurinus chloris*.—Common.

Hawfinch, *Coccothraustes vulgaris*.—I saw a small boy sitting in a village street plucking a dead Hawfinch, but did not meet with the bird alive.

House Sparrow, *Passer domesticus*.—I only saw a few.

Italian Sparrow, *P. italiæ*.—Abundant.

Chaffinch, *Fringilla cœlebs*.—Common; their songs seemed to me much more varied than they are in this country.

Linnet, *Linota cannabina*.—Common.

Common Bunting, *Emberiza miliaria*.—Common about the lower ground.

Cirl Bunting, *E. cirlus*.—Very common indeed on the mountain slopes; I have never seen them so numerous elsewhere.

Crested Lark, *Alauda cristata*.—Common.

Sardinian Starling, *Sturnus unicolor*.—I saw one flock near the east coast.

Jay, *Garrulus glandarius*.—Fairly common.

Hooded Crow, *Corvus cornix*.—Common, especially by the sea-coast.

Raven, *C. corax*.—Common.

Swift, *Cypselus apus*.—Seen first on April 19th.

White-bellied Swift, *C. melba*.—Seen on April 10th, but not again.

Great Spotted Woodpecker, *Picus major*.—Seen several times.

Hoopoe, *Upupa epops*.—I saw the first on April 15th, and several others after that day.

Cuckoo, *Cuculus canorus*.—Common, but I did not meet with it till April 15th.

Common Buzzard, *Buteo vulgaris*.—Common.

Eagle.—I saw one Eagle, but at too great a distance to be able to identify it.

Sparrowhawk, *Accipiter nisus*.—I only saw one.

Common Kite, *Milvus ictinus*.—Very common. One day I sat on a mountain side while four of these birds kept sailing about quite close to my head.

Peregrine Falcon, *Falco peregrinus*.—Seen on a few occasions.

Kestrel, *F. tinnunculus*.—Common.

Duck.—I saw a pair flying one day, but could not determine their species.

Rock Dove, *Columba livia*.—I found a colony of them inhabiting a curiously honeycombed rock high up in the mountains.

Partridge.—One evening on the mountains I put up a pair of Partridges, but could not be sure of their species.

Quail, *Coturnix communis*.—There were plenty to be heard in the low-lying country by the east coast.

EARTHWORM STUDIES.

By the Rev. Hilderic Friend,
Author of 'Flowers and Flower-Lore.'

II. Oviposition and Embryology.

Our egg is not to be found in any of the famous collections on which oologists have spent fortunes, and for the acquisition of which museums have set apart large sums. Though no one ever lavished upon it such amounts as have been paid for an egg of the Great Auk or the extinct Dodo, it is practically as seldom seen, and as little known, as any of the rare eggs which collectors covet so ardently and prize so highly.

We usually think of eggs as consisting of a yolk surrounded by albumen, and enclosed in a hard shell made of lime or some form of calcium. The eggs of birds and fowls are our types, but the egg of the Earthworm has no chalk-like shell. Most eggs, together with their shells, are formed within the body of the egg-bearing animal, but this egg differs from the majority in this respect. It is true that the egg itself is formed as usual in the ovary, and passed through a tube known as the oviduct, but the shell or case is fabricated by the animal externally, and is slipped over the egg as it passes out of the oviduct and is about to be deposited. Eggs are very commonly laid in a nest, more or less elaborately constructed, and it is a rare thing for only one egg to be laid during the season by each individual. It has been correctly surmised that the number of eggs laid by a bird or other animal bears a close relation to the exigencies and dangers which the young will be likely to encounter. Hence a Pigeon lays only a single pair of eggs for each brood, while the Thrush deposits some half-dozen in its nest; and Partridges, Pheasants, Tits, and other birds lay from a dozen to a score. Then we find that Herrings and other fish lay enormous quantities of eggs as compared with many fresh-water species.

The egg of the Earthworm is never deposited in a well-formed nest. As a rule each specimen is found at a greater or lesser distance from its neighbour. As it is not laid in the open air, on the branches of trees (as the eggs of many insects are), or on the surface of the soil, like the eggs of the Ostrich or Peewit, but in damp places under the bark of trees, under stones by streams and ponds, or deep down in the moist soil, special provision has to be made for its development amid such peculiar surroundings. Or perhaps it would be more correct to say, that as the conditions differ so does the provision for meeting them.

If the eggs of a bird or fowl be varnished so as to exclude the air, or if they are enclosed in vessels, or buried in soil at a considerable depth, the young will never be hatched; yet here is an egg which can only be hatched when it is kept moist and cool, and one which may be buried at a depth of some inches, or even feet, in earth or under water, and yet retain its vitality.

The egg of the Earthworm is seldom more than a quarter of an inch in length, and, as it is usually oval, the shortest diameter is only about half that length. It was long ago pointed out that eggs almost invariably remain during the hatching period the same size as they were when first extruded, but here is a curious exception to the rule. We should look with amazement on a Pigeon's egg which increased in size till it became as large as a hen's egg during the time when the mother bird was sitting upon it, but this is exactly what happens in the egg before us during the hatching period. It both lengthens and widens, and we shall have to enquire how this is possible.

The naturalist is already well aware of the fact that when an animal regularly lays a large quantity of eggs of minute dimensions, the offspring is almost invariably unlike its parent, and has to undergo sundry transformations, changes, and developments before arriving at any degree of perfect resemblance to the adult form. Conversely, as in the case of birds, when a few relatively large eggs are laid the young usually emerges with a strong resemblance to its progenitor. The reason is obvious. A good deal of material is needed within the egg in order that a perfectly developed brood may emerge, and when the parent is compelled, through the struggle for existence, to launch a bevy of young on the sea of life, it cannot possibly fill the pockets of each (to speak

metaphorically) with the almighty dollar, or provide that its offspring shall be started in life as are the progeny of individuals whose dangers are fewer and whose resources are more abundant. If we apply this argument to the egg in question we may conclude that its enemies are comparatively few. The colour of the horny egg-capsule is usually either a delicate olive-green or a light brown, and well harmonizes with its surroundings. The egg is, relatively to the size of the parent, large, and the number deposited comparatively small; while the young on emergence are found to be an exact copy of the original, an almost perfect reproduction of the parent.

It seems somewhat curious that an egg possessing so many peculiarities should have been almost absolutely ignored by scientific men and naturalists generally, the more so as it is easily obtained and readily examined. So far as I have been able to find during a long and extensive period of study, Swammerdam, who wrote the 'Book of Nature,' is almost the only observer who has devoted any attention to the systematic study of these eggs; but the result of his researches was such that he writes:—"Among all the eggs of insects, of which I have various species in my collection, I know none worthy of greater attention."

The case which contains the fluid matter out of which the future worm is to be evolved is of a horny, not of a calcareous, substance. It reminds us of the egg-capsules of the dog-fish, found everywhere on the sea-coast. Here we have a hint too of the aquatic origin of Earthworms. Chemically it corresponds almost exactly with our nails, and with the hoofs and horns of animals. It is cuticular in origin, that is, the skin, and not the blood, the spleen, or any other internal organ or substance, is the agent in its formation.

Everyone knows that the finger-nails are most easily trimmed after the hands have been washed in warm water. The reason is plain. Horny substances absorb moisture, and swell in proportion to the amount taken up, at the same time becoming soft and pliable. It may here be observed that several species of Earthworm, besides the semiaquatic *Allurus*, go through the process of oviposition under water. I have not seen this fact recorded by other observers, but have often myself discovered worms

submerged on the margins of Derwentwater and elsewhere at this period. Slight chemical changes produce greater or lesser degrees of hardness in the substance. Hence horny substances are not all alike hard, and the horny capsule of the worm is tolerably elastic; so that when kept in a moist condition it can be slightly expanded by the internal pressure exerted by the growing worm. But how can the worm grow? The chick can become no larger than the shell-surrounded yolk and albumen will permit, but when the young worm is hatched it will very probably be an inch in length. Let us see how this contingency is provided for. The following illustration will help to make the matter plain. If we took a small tube of gelatine, and placed within its cavity a tiny globule, we could secure the contents of the tube by drawing the two ends to a point. If now the globule could expand on the application of moisture, it must either burst its case, cause it to expand in the direction of its shortest diameter, or force open the ends of the tube. Now the egg-capsule of the worm can expand slightly, but not to a sufficient extent to allow the worm to reach full dimensions. Consequently the embryo gradually forces open the sealed extremities of the case, and thus paves the way for its ultimate escape, at the same time that it loosens its swaddling bands, and develops little by little into a perfect worm. While the beak of the embryo bird develops and hardens within the shell sufficiently to enable it to peck its way out of the calcareous covering, the worm has no such tool for opening its prison-house, and so these other means must be provided for its escape.

It may occur to some observant reader that a condition analogous to this is found in the case of the dung-flies' eggs, which are deposited with their horn-like projections upwards. In both instances, if the eggs are removed from their moist lodging-place, they shrivel and become lifeless. Worms again are not quite alone in the possession of the power to extend the egg-case during incubation. Huber long ago observed the same fact in relation to the eggs of ants, and those of certain sawflies can similarly expand to meet the requirements of the growing grub within.

The question now arises—How does the worm lay its eggs? Although many careful observations have been made for the

purpose of deciding this question, I believe I had the good fortune to be the first to observe and record the actual process. If the different books which have been written on the subject of Annelids be examined, it will be found that they either pass over this question in silence, or give a very vague and unsatisfactory account of the process.* Some time ago, however, a pleasant surprise was granted me. I was trimming up my flower-beds ready for Christmas. The soil was inhabited by a large number of Earthworms of various species. When I first began the study of these creatures only about ten British species were known. I have now raised the number to a quarter of a hundred. As I was examining the different species on the day in question, I presently detected a happy pair in the very act of manufacturing their cocoon. It was the first time in all my experience as a naturalist that such a treat had fallen to my lot, but I have since repeated the observation more than once on other species of Annelids. The process is as follows :—

When two worms are about to form an egg-case it is necessary that they should work in unison. One worm cannot do the work alone, though each worm is at the same time both male and female or hermaphrodite. A pair therefore approach each other from opposite directions, each having its head towards the other's tail. Near the middle of each adult worm is a swollen portion called the girdle or clitellum. This peculiar organ yields the horny substance of which the egg-case is formed, but it is at first soft and pliable, hardening after exposure to the air and cold. When the worms are ready for the process of oviposition the chitine is formed into a girdle around their two bodies, so that for the time being they are tied together. When the case is complete the necessary contents are poured into it from the two animals, after which they withdraw from each other backwards, and so allow the capsule or egg-case and its precious freight to slip over their heads and fall to the ground; the ends are then drawn together, and the cocoon left to its fate.

* Since this article was forwarded to the printer I have received from Dr. Ed. de Ribaucourt an extract from the 'Bulletin Scientifique,' vol. xxx. pp. 168–176, containing a "Notice Physiologique sur les Lumbricides d'Europe," in which reference is made to the act of copulation, but no allusion to the construction of the egg-case.

Should all the conditions be satisfactory, the egg soon begins to show signs of life. It is left to nature to hatch, and the time occupied in the process varies greatly. If an egg-case be opened after some time, a tiny embryo worm, or sometimes a pair, will be found inside, surrounded by a glutinous fluid. The young worm as it grows expands its case, and ultimately emerges—not as a caterpillar or larva, for it goes through no metamorphoses as does the butterfly or frog, the sawfly or even the fish, but as a worm; and now it has only to hasten development and become adult. The adult stage is reached when a girdle has been assumed, just as is sometimes the case among human beings.

It sometimes happens, however, that things do not go well. I have often observed that the eggs of worms are liable to be rendered abortive by the invasion of a smaller worm. It is another illustration of the amusing rhyme about the big fleas and little fleas. Into the life-history of these parasites, however, I must not now enter, as the subject requires a chapter to itself.

It would occupy too much space if I were to detail the wonderful process which goes on within the egg-case. The embryology of the worm has been fully studied, and is replete with marvels. If an egg is examined when the young embryo is almost ready to emerge, it will be possible, through the semi-transparent and greatly dilated case, to watch the movements of the worm, trace the current of blood along the elaborate system of vessels, and eventually observe the emergence of the baby Annelid into the world.

For the further study of this intricate subject, I may refer the reader to Mr. Beddard's valuable Monograph, and the works which are there enumerated.

ON THE PRESERVATION OF OUR INDIGENOUS FAUNA AND FLORA.

By Sir John Lubbock, Bart., M.P., F.R.S., &c.

[We are indebted to Sir John Lubbock for the following Report of his Address to the Selborne Society on May 20th.—Ed.]

The Selborne Society is especially necessary in a populous country like our own. Our rarer animals and plants are gradually disappearing. Parliament has done what it could in passing wise laws, and County Councils are doing their best to carry them into effect. They can, however, effect comparatively little, unless they have the general support of the community.

We hear a good deal about the love of Nature, but it often takes an unfortunate form. It was said of King William Rufus that he "loved the tall deer like a father"; but what he loved was killing them, and I am afraid that the love of animals shown by many people is of that description.

Again, many show their love of flowers by gathering them; sometimes getting very soon tired of them and throwing them away. I have often been asked why I do not gather flowers when I am so fond of them; but I always say that is the very reason why I prefer to leave them where they are growing.

The use of the word sport is I think unfortunate. A great deal more interest is to be got out of animals by keeping them alive than by putting them to death.

Only recently a friend of mine saw seventeen Nightingales stuck upon a gamekeeper's cottage, and when he asked the gamekeeper why in the world he killed these charming little birds, the man said that they made such a noise at night that they kept his young Pheasants awake.

At the same time it must be confessed that the strict protecting which is necessary for the preservation of game does also

to some extent protect other birds, and has therefore, at any rate, that advantage.

It is very remarkable, considering how long we have lived on this globe with other animals and plants, how little we know about them; and yet there is intense interest in unravelling the secrets of nature.

I do not allude to difficult problems which require physical laboratories and observatories, nor to those which can only be solved by technical study. The formation of the blood, for instance, is still a mystery; and it is certainly an extraordinary thing, considering the great importance of blood in the animal system, that we do not yet know how or where it is produced. There are many other questions of the same kind which might be mentioned, but which, though of great importance, hardly came within the range of such a Society as our own.

Even, however, as regards the habits and life of our commonest animals and plants, there are still an immense number of interesting problems remaining to be explained and solved.

Perhaps the commonest of all English plants is *Pleurococcus vulgaris*, the little alga or seaweed which covers the stems of trees, palings, and other woodwork of a similar character with a coating of green. It consists of small rounded cells, sometimes quite separate, sometimes grouped together in little packets of two, four, or eight. These divide and subdivide, and multiply in this manner. But obviously this is only a part of the life-history of the plant. Like the rest of its family it probably, at certain times and under certain conditions, produces spores; but all this part of its life-history is quite unknown. In the case of the common mushroom, again, the spores are of course enormously abundant, and yet nothing is known about their germination.

Peas, beans and other leguminous plants almost invariably have swellings or tubercles on their roots. These are supposed to be produced by bacteria, and when such tubercles are present great quantities of nitrogen are accumulated. An important result of this is that leguminous crops are supposed actually to enrich the soil. In Germany, in many places, the yellow lupine is especially grown for no other purpose but to be ploughed in and thus improve the soil for other crops. These bacteria are

therefore of great importance and abundance; but the rest of their life-history is quite unknown. The relation of these bacteria to the lupines, and their whole action, is still very little understood.

As regards the animal kingdom, many of the most interesting recent discoveries have been made with reference to the commonest species. Until within the last few years the male of the Gallfly, which produces the common King Charles Oak-apple, was unknown. It is now found that the species goes through a sort of alternation of generations, the autumn brood being quite different from that of the spring.

In Bees and some allied insects it has recently been discovered on what the sex of the young depends. They are almost the only animals of which this can be said.

So again in the case of Eels. It was long ago mentioned by Aristotle that nobody knew how or where Eels bred, and certainly no one had ever seen until in the last few years the egg of the Eel, or the young Eel just emerged from the egg. It has now been shown, mainly by the researches of Grassi, that the history of the Eel is in fact the reverse of that of the Salmon. The Salmon comes up into our rivers to breed; the Eel goes down into the sea and breeds in water of great depth.

All our ponds are rich in different species of Rotatoria, the Common Rotifer itself being very abundant; and yet I believe up to the present time no male of the genera *Philodina*, *Rotifer*, *Calledina*, or *Admeta* has yet been discovered.

Many other similar instances might be mentioned. These few, however, suffice to show how many interesting problems in Natural History remain to be solved.

OBITUARY.

Abraham Dee Bartlett.

Mr. A. D. Bartlett, late Superintendent of the Zoological Gardens, was born in London on October 27th, 1812, and died on May 7th last. He received a humble education in London, and at a very early age evinced a great delight in all matters connected with Natural History, and commenced business as a taxidermist in a house in Little Russell Street. In those early days scientific men and collectors of rare birds, and especially birds' eggs, made his shop a perfect resort, and his extraordinary art in taxidermy became so widespread that he was obliged to remove into larger premises; and there are few, if any, of those early zoologists and collectors left to remember that he started again in a large house in Great College Street, Camden Town. In that place his circle of admirers increased, and his first connection with the Zoological Society of London commenced. His first communication to that learned Society occurred in 1839, and from that time he worked not only for the Society, but for nearly all the scientific men and established museums, including the Queen and the late Prince Consort. It was in that house that he prepared all his exhibits for the 1851 Exhibition, and among them were, by permission, several of the Queen's specimens which are now believed to be at Windsor Castle. After the close of the Exhibition of 1851 the Crystal Palace Company started, and, not being able to find a more proficient taxidermist, engaged him as Superintendent to form the Natural History department in the South Transept; afterwards adding to his charge the aviaries and aquarium in the North Transept, besides which he attended to endless matters of a similar character in other places.

After working laboriously for the Crystal Palace up to 1859, on the death of Mr. John Thompson, then Superintendent of the Zoological Society, Dr. P. L. Sclater, the newly appointed Secretary, in course of conversation with Mr. Henry Walter, of

'The Times,' remarked that they were seeking a new man for the post. Mr. Walter at once recommended Mr. Bartlett, and he was immediately communicated with, and accepted the post, which he held to the end of his life.

It would be difficult, and beyond the limits of this Journal, to give a detailed insight into the vast amount of work carried out during the years from 1859 to the present day, which, we are given to understand, will be compiled before long in a more collected and chronological form.

Mr. Bartlett was awarded the medal for taxidermy at the 1851 Exhibition, the bronze and silver medals of the Zoological Society, and a very large series of the highest testimonials from different societies and exhibitions. He also received the bronze medal, conjointly with his eldest son Edward, at the 1872 Exhibition, and testimonials, with his sons Edward and Clarence, at the Colonial Exhibition.

During the years he passed in the Zoological Gardens he became more closely connected with the scientific world, and devoted his whole time and energy to the study of animal life, which all those who knew him can testify. He was a man of vast resource and quick perception, in many difficult cases was always ready to help those around him out of their almost hopeless position, kind to all classes of society, and at the same time of a retiring nature, never wishing to force himself upon society. —(*Edward Bartlett*).

Fritz Müller.

The death of this well-known biologist is announced as having taken place at Blumenau, Santa Catarina, Brazil, on May 21st. Dr. Fritz Müller was an observant and philosophical naturalist, of whom frequent mention is made by Darwin in the 'Origin' and 'Descent,' and who is also to be remembered by his volume entitled 'Facts and Arguments for Darwin' (English transl.). He also contributed some original observations and suggestions on the subjects of Mimicry in Butterflies and Coloration of Caterpillars, and was elected an Honorary Fellow of the Entomological Society of London in 1884.

NOTES AND QUERIES.

MAMMALIA.

CARNIVORA.

Pine Marten in Ireland.—It will perhaps be of interest to your correspondent, Mr. W. W. Flemyng (p. 141), and to other Irish naturalists, to learn that I have five living adult Pine Martens from Ireland. The species is decidedly less rare there than in the three other divisions of the British Isles, but Irish naturalists and the Martens at large will thank me not to indicate the precise localities whence my specimens come. One of them I obtained so recently as the end of February, and in the early morning of the last day of March she gave birth to a litter of young, apparently two in number. Young Martens are, as I discovered in 1882,* pure white at birth, beginning to get grizzled within a week, and becoming brown within four weeks; but in the present instance, with a freshly-caught mother, inspection was quite out of the question. Assuming, from the date of her capture, that she might be in young, I prepared a suitable cage for her; but not anticipating the increase would take place so early had not shifted her from the small cage in which I had originally placed her. It was impossible then to move her, and hopeless to expect her not to eat the cubs in a small cage containing merely a little bed-box; so I prepared a large box, and adjusted it without noise, so as to fit against one of the narrow openings through which the cage is cleaned, as we could not, of course, block the only door. This opening is little more than two inches high, but she very soon moved the cubs through it into the more spacious and secluded bed-room. Since the first two days, however, I have been unable to certainly distinguish more than a single voice, so it is not unlikely that one cub has come to grief.

Those who are acquainted with Martens (and those only) will appreciate their gnawing powers; and during the night of Easter Tuesday (April 20th–21st) this Marten ripped out a strip from the front edge of the flooring of the bed-box, the width of which was only 1½ in. at the widest point,

* See 'Zoologist,' 1883, p. 203. The same pair of Martens bred again in 1884 and 1885, and both eventually died well on in their seventeenth year (at least).

through which she got out! She found herself not absolutely at liberty, but inside a large cage, from which, however, she could have escaped almost anywhere. It would seem as if an inspection brought her to the conclusion that it would be very difficult, perhaps hopeless, to get the young away in safety, so she actually squeezed her way again through the 1¼ in. opening back into the box, where she still remains. Sundry scraps of iron and zinc wedged in prevent her again using this hole, but, as before, I did not venture to drive nails, or otherwise make a noise. An unusual display on April 29th of the cub's vocal powers, followed, to the moment of writing (May 3rd), by unwonted silence, may mark the opening of its eyes; for young Martens are blind for a little over four weeks. One of my other Irish Martens (a male) is remarkable for having only scattered flecks of white in place of the normal yellowish-white "shirt-front." — ALFRED HENEAGE COCKS (Thames Bank, Great Marlow, Bucks).

UNGULATA.

Polydactylism in the Horse.—A colt was produced from a cart-horse early this month at a farm near here. Three of its feet have each two quite divided toes. The left hind foot is normal, and it can walk on the hoof of the right one. The two front feet are rather distorted. Otherwise it is a perfect animal. As this peculiarity seems to point to more than ordinary monstrosity, it may interest some readers of 'The Zoologist.' It appears to be rather improbable that it is a high-bred animal.—H. L. SICH (c/o Rev. J. P. Smith, Whixley Vicarage, York).

[With reference to the above interesting record, it may be remembered, as Bateson observes, "Variation in the number of digits in the Horse has been repeatedly observed from the earliest times." The whole subject is treated in that author's 'Materials for the Study of Variation' (pp. 360–73), and many instances given which are grouped and analysed.—ED.]

AVES.

Swallow-tailed Kite in Suffolk.—Through the kindness of Dr. Otho Travers, of this town, I was lately afforded an opportunity of examining an example of *Elanoides furcatus*. It passed into the possession of this gentleman from his father, the late Mr. O. W. Travers, by whom it was shot in Suffolk. I am afraid it is now impossible to state either the exact locality in that county or the year, but, so far as Mr. Travers is able to judge, it was shot by his father near the village of Mildenhall between the years 1830–1840; there can, however, be no doubt as to the county. The specimen in question is in excellent preservation, and is the only one killed in Britain known to be in existence. I have carefully sought for indications that the bird had been in confinement, and of this I cannot entertain the

least suspicion. In the opinion of Prof. Alfred Newton this beautiful bird has unquestionably occurred twice in Great Britain, and as it is a very vagrant species, it seems unreasonable to disallow its claim to be considered a wanderer to our shores. The species is a native of Tropical America, and the occurrence of individuals with us is perhaps mainly interesting as showing that "Transatlantic stragglers" are not wholly confined to natives of the northern half of that continent, though whether those stragglers cross by a different route, or in a different way, it is impossible to say. For a description of the species the reader may be referred to Dr. Coues's 'Key,' or to Mr. Ridgway's 'Manual.'—W. Ruskin Butterfield (St. Leonards-on-Sea).

Honey Buzzard in Staffordshire. — Mr. E. Baylis's record of this occurrence (p. 232) contains some errors which are well to be corrected. The date given (1894) is incorrect. I examined the bird some years since, and was informed by the gardener who killed it (not the keeper, as stated) that it was obtained June 16th, 1891; and the record has long since been saved from oblivion, having been recorded fully in the 'Journal' of the Birmingham Natural History Society. Moreover, if Mr. Baylis had referred to McAldowie's 'Birds of Staffordshire,' he would have found several other recorded occurrences; and again an additional specimen recorded by myself in Zool. 1888 (p. 394). As regards Warwickshire, several have occurred within the county.—J. Steele Elliott (Dixon's Green, Dudley).

Breeding of the Common Snipe in Romney Marsh.—Towards the end of April, some three or four years ago, I flushed a Snipe in Romney Marsh; the question immediately occurred to me, does the Snipe breed here? There are many very suitable places, though none of large extent like there are in the fens. Being well acquainted with the bird during the nesting season in the fen country, I at once began to look for the nest, but could not find it. Every year since I have put up three or four in different parts of the marsh, in the month of April; but they always seemed to be only feeding, as the places were generally very wet, and no nest was to be found. On April 24th last, however, while hunting a small piece of rough sedge and rushes with my brother, I saw a Snipe get up right at his feet, and as usual, when there is a nest, fly away slowly and close to the ground. The nest was easily found, situated on the top of a tussock, and contained four typical eggs. We subsequently put up several more Snipe, but they were obviously only feeding, and we were unable to find a second nest. So far as I can make out, this is the first recorded instance of the breeding of this species in Kent; I can find records for all the other southern counties from Cornwall to Essex, and Borrer, in his 'Birds of Sussex,' mentions it as nesting on the Pevensey Levels, only some twenty-five miles from where I found

the above nest. Being now at work during my spare time in preparing a History of the Birds of Kent, I should like to hear from any reader of 'The Zoologist' who knows of a previous instance, or would be kind enough to furnish me with any information regarding the occurrence of rare birds, the distribution of local species during the breeding season, winter visitors, or the whereabouts of private collections; all such information will be gratefully acknowledged.—N. F. Ticehurst (Guy's Hospital, London, S.E.).

An Unfortunate Cuckoo.—My attention has recently been directed to a dead Cuckoo found on a moor near here, which must have met its end under somewhat peculiar circumstances—I might say melancholy circumstances—when we consider the long flight which this bird must have taken a short time before it was destroyed. The enemies which may have attacked it in an unwary moment—as it was found beside a small watercourse, where it may have been either drinking, bathing, or otherwise occupying its time—are Stoats, Weasels, Dogs, and Cats; or, among birds, the Merlin, Kestrel, Sparrowhawk, and Hooded Crow, of which the first is rare in this neighbourhood. But there were no signs of picked-out eyes, blood-sucking about the neck, or anything that would indicate an attack by any of the above-mentioned animals. The parts eaten away when I saw it were indicative of Rooks, who had fallen upon it after death; and we may suppose from other appearances that it had been perhaps killed in battle, either between one or more of its own kind or with some other bird, as there were feathers, apparently plucked, lying at three places in the vicinity where the dead bird was found, while its neck was practically cleared of feathers in some parts, without indication of cuts. I have seen these birds somewhat pugnacious about the time they arrive, as well as during their stay here, and it is possible that there may have been a fight, ending in the death of one of them. In the vicinity there was a Ring Ouzel's nest, and it is a question whether it would be possible for a Cuckoo to tamper with one of these Thrushes with the view of depositing an egg in its nest. The other birds in the neighbourhood which could have fought would consist of Lapwings, Golden Plovers, Curlews, Grouse, Partridges, Wood-Pigeons, or Rooks. The last mentioned sometimes have great fights with Hawks, and if the Cuckoo possesses the boldness of the Hawk it might enter into a disadvantageous conflict with one or other of these birds.—Wm. Wilson (Alford, Aberdeen, N.B.).

[I found a dead Cuckoo several years ago among some trees near Purley, Surrey, and ascribed its death to contact with some tall wire-fencing (?). It was in such perfect condition that it was set up, and is still in my possession. Good authorities—Bowdler Sharpe, Jefferies, amongst

others—have recorded that small birds will mob a Cuckoo from its similarity in appearance to a hawk.—Ed.]

Peculiar Nesting Habit of the House Sparrow.—We have a colony of Sparrows which build nests in a creeper on the front of our house. This year the creeper was very slow in coming out, and the nests were therefore very visible to the naked eye; so the Sparrows took a great number of leaves from a tree in front of the house and stuck them about the creeper, with the view apparently of covering up its deficiencies. Of course they dropped four for every one they fixed in the creeper, and those they did get there were soon blown down; but they nearly stripped the side of the tree next the house.—A. L. Lewis (54, Highbury Hill, N.).

Change of Plumage in the Nonpareil Finch.—Last summer I purchased a Nonpareil Finch, *Cyanospiza ciris*, from a local dealer. When I first had the bird its breast-feathers were scarlet, but since its last moult they have become orange. I should be glad if any readers of 'The Zoologist' could inform me if there is any method of restoring the scarlet colour of the feathers at the next moult. The bird itself is in the best of health, and sings well, and I may say the blue of the head and the green feathers on the back leave nothing to be desired. It is kept in a roomy cage, has plenty of exercise, and in addition to ordinary seed diet has abundance of insect food. I am aware that Nonpareils in captivity are very liable to lose colour, and should be glad of any suggestion as to feeding, &c, which might enable me to remedy this. — Graham Renshaw (Sale Bridge House, Sale, Cheshire).

Occurrence of the Black-headed Bunting in Sussex. — Early in January of the present year, while looking over some birds in the possession of Mr. Daniel Francis, I recognized an example, in adult female plumage, of the Black-headed Bunting, *Euspiza*, or, as it is more generally called, *Emberiza melanocephala*. It was given to Mr. Francis on the morning of Nov. 3rd, 1894—the day on which, as Gould supposed, the first British example was killed twenty-six years before—by one of the men of the coastguard service, who had just picked it up in an exhausted condition close to the metals on the South Coast line of railway near Bexhill. The bird had a shattered wing, and had probably been shot at while perched on the telegraph-wires. Through my friend's kindness the specimen is now in my possession. The original British specimen was shot in this county in November, 1868, and is in the choice collection of Sussex birds formed by Mr. Monk, of Lewes. Since that year it has occurred twice in other parts of Britain, so that the present makes the fourth record. During the breeding season the species is "abundant in Asia Minor, all through the Caucasus" mountains, but it rarely extends westward or northward of the

peninsula of Italy; while during the autumnal migration its flight is directed eastward to India, which forms its winter quarters. It is enough to excite one's wonder that individuals should be found in this country (and the same may be said of Heligoland) in November, separated as they then are from their rightful home by almost the whole length of Europe and half that of Asia. A short notice of this occurrence may be seen in the second volume of Dr. Butler's 'British Birds,' p. 192 (Addenda).—W. Ruskin Butterfield (St. Leonards-on-Sea).

Nesting of the Grey Wagtail in Lincolnshire.—I have been delighted in watching a pair of Grey Wagtails, *Motacilla melanope*, Pallas, which, *mirabile dictu*, have actually brought off a brood within three feet of my library window. The nest, the exterior of which is composed of fine grasses and roots, and lined with cow-hair, is five feet from the ground, in the wall-ivy. It was commenced the second week in March; I dare not look too closely to ascertain when the first egg was laid. The female commenced sitting about April 25th. The young were hatched on May 9th, on which day both the parents commenced feeding them with insects and their larvæ. These Wagtails were first seen on Nov. 10th, and have kept about the premises ever since. There are several spring-heads and water-courses which they haunt, but none very near the house. It has been a daily pleasure to watch these elegant and chastely coloured little creatures, so suggestive of a north-country beck, running here and there on the lawn, sometimes on the window-sill, or perched on a window-box or the scraper of the side door. When I found they really intended nesting precautions were taken to prevent them being disturbed, and since the female commenced to sit six worthless stray cats have disappeared without subsequent enquiries as to their whereabouts. I was pleased (May 22nd) when the young birds (I think four of them) left the nest, and strong enough to fly to the house-roof and into an old beech-tree on the lawn. The old birds used alternately to bring insects to the nest almost regularly every five minutes, commencing, to my knowledge, at 4 a.m. and to 7.30 p.m. This is the first occasion on which the Grey Wagtail has been recorded nesting in Lincolnshire, and, as far as I am aware, in Eastern England south of the Humber. It is, however, a most regular winter visitant.—John Cordeaux (Great Cotes House, R.S.O., Lincoln).

Arrival of Summer Migrants in Gloucestershire.—The following is a list of some of our summer migrants, with the dates upon which I first observed them in Gloucestershire (near Cheltenham):—Chiffchaff, March 25th; Willow Wren, April 11th; Redstart, April 14th; Whitethroat, April 13th; Swallow, April 13th; House Martin, April 14th; Blackcap, April 16th; Lesser Whitethroat, April 18th; Cuckoo, April 19th; Sand

Martin, two seen on April 4th.—Bernard Rivière (Flaxley, 82, Finchley Road, N.W.).

Inherited Instinct in Birds.—It has been asserted, without a shadow of real evidence to support the statement, that birds build their nests by imitation, and that the reason why many of them at the commencement of the season trifle with building material for some time before they produce a satisfactory structure is that they are unable at once to remember exactly what the character of the nest was in which they first saw the light of day. In 'British Birds, with their Nests and Eggs,' now in course of publication, I pointed out that young birds never really see the more complex part of the nest, inasmuch as their vision is mainly confined to the lining (which is moulded into form in the most primitive fashion); and in direct proof of the fact that birds do not build by imitation, I recorded the fact that in 1895 and 1896 different hen Canaries, reared in the usual square box of a London breeding-cage, were turned loose in aviaries in which no typical finch-like nest existed, and, after the lapse of about three hundred years, reproduced nests nearly resembling those of their wild ancestors. This year a still more convincing proof of the instinctive building habit in birds has been given. I turned loose a Canary, also cage-bred, in one of my aviaries, late in April. The bird, without my knowledge, took possession of a square box hung high up on the wirework, and had almost completed a nest therein, when I lifted the box down to see whether any bird had made use of it. Although I hung up the box again, the Canary deserted it, and commenced at once to build an elaborate cup-shaped nest in a dead bush. In three days this nest was completed; the following day she began to lay, and deposited five eggs, upon which (as I write) she is sitting steadily. On the other hand, Goldfinches and other birds reared out-of-doors take possession of cages and boxes in which to nest when in captivity.—Arthur G. Butler (124, Beckenham Road, Beckenham, Kent).

PISCES.

Bull-dog Variety of the Sapphirine Gurnard at Great Yarmouth.—During the middle of May an unusual number of Gurnards were brought to the fish-wharf by local trawlers. The Sapphirine Gurnard, or Tub-fish, *Trigla hirundo* (local, *Latchet*), was exceptionally plentiful, and ran to a very large size. In one instance I saw a specimen very prettily mottled with a fine bluish network of markings. The pectoral fins were barred very like those of *Trigla lineata*. On May 18th a sixteen-inch example was brought to me, exhibiting the peculiar characteristics which have been noticed in several species, and which have gained for that abnormality the title of "bull-dog variety." The "latchet" had a head-piece that had the appearance of

having been, in nautical language, "stove in." I have on two or three occasions found this feature displayed in the *Gadidæ*, in which the deformity amounts to positive ugliness. I am indebted to my friend Mr. C. Rumbold, an amateur photographer living in this town, for the photograph from which

the accompanying illustration has been taken. A normal specimen has been introduced to show the contrast. The fish is now in the Cambridge Museum.—Arthur Patterson (Ibis House, Great Yarmouth).

[Besides the above interesting record relating to the Gurnard, in Mr. Bateson's 'Materials for the Study of Variation,' pp. 57–8, will be found instances of the "bull-dog" variety in the Carp, Chub, Minnow, Pike, Mullet, Salmon, and Trout."—Ed.]

CRUSTACEA.

A Gigantic Lobster.—Some of our daily papers having published the statement that the New York Aquarium contained the largest Lobster in the world, the Editor wrote to the Director of that institution, who has kindly supplied the following note on the subject :—

"Replying to your letter of April 20th, I am not authority for the statement that a large Lobster, recently exhibited in the Aquarium and now in the taxidermist's hands, is the 'largest Lobster in the world.' Its weight, as given to me by an assistant of Prof. Bristol, of New York University, was 33 lbs., of which the large forceps furnished 17 lbs. The total length he found to be 23¾ in., from rostrum to end of telson, not including hairs. The straight measurement of the large forceps is 15 in., and its girth 20½ in. The length of the small forceps is 15½ in., and its girth 15¼ in. The carapace is 9¾ in., exclusive of rostrum, which is $2\frac{5}{16}$ in., and its girth behind the cervical groove is 19¾ in. The Lobster is *Homarus americanus* (M. Edw.). The example was taken by a cod-fishing smack off Sandy Hook late in March. It lived in the Aquarium only three weeks. The lower salinity of the water supply and the reduced pressure were the probable causes of its death. It took no food during captivity. When the salinity of the water is greater, as occurs in the fall of the year, it is practicable to keep large Lobsters alive during the entire winter, and they can easily be induced to feed upon pieces of cod or herring." —Tarleton H. Bean, Director (New York Aquarium).

NOTICES OF NEW BOOKS.

Problems of Nature: Researches and Discoveries of Gustav Jaeger, M.D. Edited and Translated by HENRY G. SCHLICHTER, D.Sc. London: Williams & Norgate. 1897.

THIS volume contains a selection made from numerous essays published by Dr. Gustav Jaeger, who is well known to the English-speaking world through his hygienic discoveries and researches. To many it will come as a surprise that the familiar name of the author is also attached to many original contributions on the subject of organic evolution, and that his work was not only approved, but commended, by Darwin himself. The contents of the present volume are divided into Part I.—Zoological; Part II.—Anthropological; Part III.—Varia. In each section zoologists will find much to interest them, though probably our readers will be more attracted by the first part.

Dr. Jaeger is an original thinker; his views are enunciated with much force and accentuated by brevity, whilst quotations and foot-notes are phenomenally absent. He seizes his problem, wrestles with it, and, it must be said, usually declares that he has conquered it. Essays V. and VI., "On the Origin of Species" and "Sexual Selection," though devoted to now somewhat hackneyed subjects, are brimful of original suggestions and fresh points for consideration; in fact, it is quite a relief to find a writer treating these topics by the Darwinian method and yet from his own point of view. As regard sexual selection Dr. Jaeger is one of the small *coterie* who are gradually acknowledging the strength of this hypothesis—in fact, to use his own words, he is "inclined to attribute considerably more importance to sexual selection than Darwin does." Another most interesting zoological essay is "On the Physiological Importance of Savorous and Odorous Matters (matters which can be tasted and smelled)." The author's "starting-point is that every animal species has its specific odour." He also claims the same diversity in taste, not only as regards the birds, but that the eggs of every

species are distinctly different. From his own experience, as director of the Zoological Gardens at Vienna, he is able to state, and from his own examination, that many birds, such as the Cassowary, Turkey, Peacock, Guinea-fowl, Pheasant, Californian Quail, "have specifically different eggs." He therefore comes to the conclusion that "the substances which produce these specific odours and tastes have not been acquired by the animal during its embryological development, but that they form an important constituent of the germ-plasma itself."

Our limits will not allow of more reference to other essays or more quotations from the same, but they all have the merit of raising fresh thought-concepts, even when not securing the reader's conviction on their main thesis; they at least quicken when they do not convince, and are a valuable addition to the ever increasing literature on speculative zoology.

Pheasants: their Natural History and Practical Management. By W. B. Tegetmeier, M.B.O.U., &c. Third Edition, enlarged. Horace Cox. 1897.

The third and enlarged edition of this book will be welcomed alike by the naturalist and the sportsman, both at home and in our colonies, for the Pheasant, though an introduced bird by, or anterior to, the Romans, is still by most Britons cherished almost as a visible sign of a British institution. The name is always familiar; even in South Africa it is applied to species of *Pternistes* and *Francolinus*, and there are now more or less successful attempts at introducing the real bird in that much-talked-about region. Mr. Tegetmeier's volume should in our colonies be widely known and read, for it contains the information that is absolutely requisite to enable the bird to become established in those outlying estates of the Greater Britain. It is but a few years back that even in the Transvaal a wealthy Boer asked the present writer for advice on the subject, and stated his intention to procure birds from Holland. The present volume was the very one to have been placed in his hands, and might have inculcated also a better love for things British. We linger on this point, because the book is already so well known

in our own country, while it is able to supply an actual want in the Colonies, where the Pheasant will certainly join his emigrant preservers. What is required there is a thorough knowledge of home methods as to breeding and preserving, qualified by adaptation to local conditions, and preservation from the attacks of foreign "vermin."

A wide margin of selection is possible, as the chapters on "Pheasants adapted to the Covert" amply testify, and the birds described therein are beautifully illustrated. But the illustrative charm is to be found in the vignettes, which represent many mutilations and distortions interesting to the zoologist, and "still" game which will not, as is often the case, appal the critical eyes of the experienced sportsman.

Papers presented to the World's Congress on Ornithology. Edited by Mrs. E. Irene Rood, under the direction of Dr. Elliott Coues. Chicago: Charles H. Sergel Company. 1896.

This volume is a souvenir of the World's Columbian Exposition of 1893. The Congress on Ornithology was decided on rather late, and but a few weeks elapsed between the formation of the Committee and the actual session of the Congress. The design of the Committee was "to have the Congress treat of birds from the standpoint of the scientist, the economist, and the humanitarian," and the last position has certainly been well represented.

The Presidential Address of Dr. Elliott Coues is a most interesting ornithological contribution, and reminds one very much of a compressed analogy to some of the letters in the 'Introduction to Entomology' by Kirby and Spence, for it details with much freshness the many benefits and the fewer injuries derived from birds. Dr. Coues emphasizes the fact of their beneficial qualities by a very practical remark, and one which to-day possesses as much force in England as in America. "The usefulness of birds as insecticides is measurable in money—and that is something everybody can understand."

A very suggestive paper entitled "Hints at the Kinship and History of Birds as shown by their Eggs" is contributed by Mr.

Jas. Newton Baskett. Some coloration seems to be regarded by the author as of a survival nature. "The modern birds have come out of an unknown region, bringing with them their desire to get back—and their eggs marked to suit the foreign surroundings. . . . . The bird which in the Arctics long ago may have lined its nest with green moss or grey lichens, may now floor it with flax in Dakota, or pad it with cotton in Texas; and yet in either deposit a solid green or mottled greyish egg in keeping with the colours of 'the old house at home.'"

Another instructive memoir is that by J. J. Quelch "On the Birds of British Guiana." The birds of this habitat have very pronounced features, such as the large number of species, the marked abundance of the individuals of a species, and an astonishing brilliance of plumage. Food relations are also peculiar: many Hawks examined at different times of the year, and in different places, have revealed only a diet of moths, beetles, grasshoppers, locusts, leaves, and fruit. The vultures, *Cathartes*, in the forest districts, contain almost invariably a preponderance of fruit and leaves; while *Mycteria*, the Giant Stork, in the depth of the dry and wet seasons lives on beetles, grasshoppers, and locusts. We must conclude a hasty survey by noticing the more personal contribution of Paul Leverkuhn, of Bulgaria, on "Ornithologists, Past and Present." The author possesses a collection of ornithologists' portraits "which is said to be the richest one in the world," and he is still desirous of receiving additions to his albums. It is well to know where such collections are amassed, and it is to be wished that copies of some may from time to time be published. How we would all value to-day the inspection of a portrait of Gilbert White of Selborne.

Wild Bird Protection and Nesting Boxes. By JOHN R. B. MASEFIELD, M.A. Leeds: Taylor Bros. 1897.

THIS delightfully illustrated little volume is written by a true lover of birds, who, by protection and affording facilities for nesting, has during the last few years had no fewer than thirty-six "species of our wild birds nesting in and around my own garden,

shrubbery, and buildings," and the main object of the publication is to give "some information from actual experience on this subject, which I trust may induce others to do something for the preservation of our fast-diminishing wild birds."

Parts I. and II. are devoted to a *résumé* of the governmental edicts passed in this country for wild bird protection, and to the mediæval bird laws directed to the same purpose.

Part III. deals with the more important consideration of "Bird Nesting Boxes," in which the author not only details his own successful contrivances, but gives examples of similar measures pursued for the same purpose by other well-known naturalists and admirers of our native avian fauna. One observation is to be noted: "Many of our bird lovers seem to consider that success in attracting birds to nesting-boxes depends to a great extent on the aspect in which the boxes are placed, and probably a south or south-east aspect is the best, as the birds then get more sun; on the other hand, I have frequently found Flycatchers building against walls having a westerly and even northerly aspect, and Tits and Redstarts nesting in holes directly facing the north; so that it seems really to be of little moment in what direction a nesting-box or hole faces, if the bird finds the spot sufficiently quiet to carry on its nesting and family duties, and sufficiently sheltered from rain."

But with all care and contrivance three enemies must be reckoned with during the nesting season, *viz.* the small boy, the cat, and the House Sparrow. The evil propensities of the last-named bird as experienced by the author are clearly stated. "No doubt remains that he is a determined destroyer of the eggs of other small birds, and to the House Martin he is an inveterate plague, taking possession of its nest, and appropriating it to his own use."

The volume concludes with an enumeration of "Orders applying to Counties, &c., under Wild Birds' Protection Acts."

The illustrations, the result of photography, give a peculiar charm to a remarkably interesting and useful little book.

Birds of our Islands. By F. A. Fulcher. Andrew Melrose. 1897.

This is an excellent book to put in the hands of a bird-loving boy or girl, or better still to serve as a school prize book. We well recollect how little natural history was found in the academical volumes presented to the weary scholar some forty years ago; and when some zoological treatise was dispensed it was usually a mixture of second-hand observation and turgid teleology. Now all this is changed, and there seems to be a danger sometimes that the mass of juvenile literature will end in amateur science.

Mr. Fulcher writes pleasantly on our native birds, and treats his subject on the lines of a somewhat conversational narrative, in which a considerable amount of information is afforded as to habits, nesting, &c. The method is purely non-scientific—not by any means unscientific—the English bird names being alone given, and classification quite ignored; the principal works used in verification and amplification of the author's own observations being, we are told, Hudson's 'British Birds' and Dixon's 'Eggs and Nests of British Birds.'

The illustrations are numerous, but we cannot help thinking that the facial expression of the Long-eared Owl given at p. 249 is of a particularly benign and human-like description.*

The Fauna of British India, including Ceylon and Burma: Hymenoptera. Vol. I. By Lieut.-Col. C. T. Bingham. London: Taylor & Francis. 1897.

We recently noticed the completion of Sir G. F. Hampson's contribution to this series on the Moths or Heterocera. With commendable promptitude Col. Bingham's first volume of the Hymenoptera—Wasps and Bees—has appeared. Indian naturalists as a whole and oriental entomologists in general will gladly welcome this publication. The Hymenoptera have not attracted numerous workers and students as the Lepidoptera have done, and yet, as our author remarks, the "Hymenoptera have a right to be considered the most highly developed mentally of all

* This figure is clearly a reprint from 'A Year of Sport and Natural History.'

insects." Many observations have proved this, but many also are lost through field naturalists being often unable to recognise the species, nay, even the genus, of the insect whose economy or traits they have observed. It is sometimes a modern habit to decry the labours of the describer—in fact, species-monger is not an unknown term—and the taxonomist is often looked upon as a harmless enthusiast of the type of the "Scarabee" of Oliver Wendell Holmes. But how can any philosophical observation be recorded concerning a species which belongs to no nomenclature and is outside a known classification? Such a book as we now notice becomes a positive boon as much to the observant naturalist as to the future specialist. It is the code by which we identify the creatures whose habits we study, or whose bodies we preserve.

The method of this volume is in accord with that of its predecessors; but "keys" are given to species as well as to genera, and of the last a typical illustration is always afforded. Four coloured plates are appended, and we welcome a volume we would gladly have possessed when sojourning years ago in the region to which it refers. We can speak from sad experience of how the portals of nature remain hidden by the absence of a technical guide, and of how a good taxonomic volume is not a hindrance, but frequently a positive necessity, to one who would record his observations made in the field.

The illustrations are from drawings by Horace Knight, and the chromo-lithography is the work of West, Newman & Co.

Investigations into Applied Nature. By WILLIAM WILSON, Junior. London: Simpkin, Marshall, Hamilton, Kent, & Co., Limited. Aberdeen: John Rae Smith. 1896.

THIS small volume consists mainly of various papers and lectures contributed by the author to different institutions and publications during the last decade, and comprise some of a purely botanical and agricultural interest, and others of a zoological nature. Mr. Wilson has evidently an extensive knowledge of general agricultural and farming pursuits in Aberdeenshire, and has also devoted no little observation to the general fauna and flora of his county. Even under such a non-zoological

title as "Our Indigenous Flora as Food-plants," we meet with facts illustrating the change of diet animals can sustain under necessity, and our author has seen sheep eating fronds of *Asplenium viride*, *Trichomanes*, and *Adiantum nigrum*, when he considers the ferns were supplying the place of trefoils "on our cultivated fields."* In 1883 and 1884 he also observed that all ferns in a certain district were "occasionally eaten by quadrupeds."

In a paper on the habits and instinct of the Rook, we obtain a few local facts relative to the visitation of birds as modified by man's action on the environment. In this part of Scotland drainage has brought about the disappearance of the Snipe, whilst other birds "more inclined to wade into water" have in some cases resorted to moors. The Pied Wagtail has been seen by Mr. Wilson several times inland during the winter season, and the Lapwing has of late years shown a similar tendency. The "Great Curlew," according to our author, only found its way into the moors of Aberdeenshire some forty years ago. The Common Gull, *Larus canus*, came to the moors of Aberdeen a few summers ago, and nested there.

In conclusion we may remark that, if many of the records are not told for the first time, the volume abounds with the natural observations made by a shrewd Scottish yeoman and lover of natural science, and should be interesting alike to those who manage an estate or cultivate a farm. It would, however, be improved by the supervision of a good "reader," for we do not all write with the majesty of Milton or the charm of Macaulay, and style has not only been known to float a bad book, but also to ruin a good one.

* Low in his 'Domesticated Animals of the British Islands' long since told us how the sheep of the Zetland and Orkney Islands at certain seasons find their way from the mountains to the shores, and feed on the *Fuci* and other marine plants.

EDITORIAL GLEANINGS.

In the 'Annali del Museo Civico di Storia Naturale di Genova," Ser. 2a, vol. xvii. (xxxvii), under the well-known title "Viaggio di Leonardo Fea," which has headed very many zoological contributions by different specialists during recent years, is found a "Riassunto Generale dei Risultati Zoologici" by the traveller and collector himself. Fea made some most extensive zoological collections, embracing many orders, in Upper Burma, and these, under the energetic supervision of Dr. Gestro, have been, with the excellent method pursued by the institution over which he presides, distributed for identification amongst well-known specialists. This has resulted in the publication of ninety-five different special memoirs, and three others which partially refer to the zoological spoils of this expedition. The present summary forms in its separate condition a most interesting volume, in which Signor Fea has given to zoologists the results of a naturalist's observations and impressions made in a most productive region. We have placed our copy by the side of the Rev. F. Mason's early work on the Biology of Tenasserim and Burma, published at Maulmain in 1852.

In the 'Bulletin de la Société Nationale d'Acclimatation de France' for April are some interesting notes on the "Fish-oil" industry of Japan, by Daniel Bellet. Sea-fishing affords great employment to the Japanese. A French consul has recently estimated that no less than 3,300,000 individuals are engaged in the vocation, and these figures are apparently accurate from the statistics afforded by other documents. There are 710,610 fishermen, each of whom is the head of a family; 180,517 households salt fish or prepare marine manure; 1,592,690 persons gather seaweed; and 748,231 occupy themselves as under-salters, or with other work connected with the industry. The proceeds of these fisheries are valued at thirteen millions of yens—a yen is *nominally* a dollar or a little less than five francs, though *actually* it is a little less than three francs—including the fish-oil, but not counting the secondary productions. The Japanese thus largely practise an industry well known in Europe, and Herrings, Sardines, Whitings, Haddocks, Skates, Congers, Tunnies, and Shads are used for the purpose. In the same 'Bulletin' for March we read that M. Edouard Foa, the well-known traveller, has sent home from Central Africa a tube containing specimens of the Tsetse Fly in a dry condition, which will doubtless prove

useful for bacteriological study. These insects will be distributed in the special laboratories "de l'Institut Pasteur, de l'École d'Alfort, de la Faculté de Médecine ou du Muséum."

Undismayed by the daily Monday to Friday performances of the Press Band in the Embankment Gardens, a pair of Sparrows have built a nest in the ornamental ironwork of the band stand, immediately over the conductor's head, and within a few feet of his bâton. Here a young family is being reared, with apparently healthy appetites; for the old birds, taking no notice of the performers, even in the loudest passages, nor of the big crowd of listeners surrounding them, come every few minutes to their untidy nest and feed the youngsters. ('Westminster Gazette,' May 27th.)

At Mearbeck, near Settle, the beautiful residence of Mrs. Preston, a large rookery, which has been there for a very considerable number of years, has unexpectedly been abandoned. Mr. Wooler, the gardener, says that in February last a large number of Rooks came to their old nests and, he thinks, took out the linings of the nests, which can be seen on the ground. Afterwards every Rook disappeared, and the place is now unusually quiet for this time of the year. ('Craven Herald,' Skipton, April 30.)

Lieut.-Colonel H. W. Feilden and Mr. H. J. Pearson, who made a successful expedition to Novaya Zemlya in 1895, are about to proceed to the Petchora river and the coasts of Siberia. The start will be made from Norway, and the explorers will study the geology and zoology of the North Russian shores, and make collections for the British Museum. Some years ago Col. Feilden spent an entire winter in Grinnell Sound—the most northern portion of the globe in which fossil remains have been brought to light—and there obtained ample proof that animals were on the move the whole time.

In 'Nature' for May 27th, Grassi and Calandruccio, supplementing their last announcement on the larva of the Common Eel, that they had succeeded in following the transformation of *Leptocephalus brevirostris* into *Anguilla vulgaris*, now supply figures of a specimen of *L. brevirostris* with its larval teeth still intact, and also of another specimen captured by Dr. Silvestri in the Straits of Messina, which is described as follows:—"Its total length is 71 mm. The anus is about 29 mm. from the apex of the snout, the anterior extremity of the dorsal fin being about 25 mm from the apex of the snout. The head and the point of the tail have already noticeably acquired the known special characteristics of the Eel. The larval teeth

have totally disappeared, while the distinctive ones seem still entirely absent. It lacks all traces of pigment." The authors consider that these characteristics are sufficient "to convince anyone of the reality of the metamorphoses discovered by us." As Mr. J. T. Cunningham has previously pointed out, "it is a curious fact that the larvæ, now identified as those of the Eel, are found in greatest abundance in the stomach of the Sun-fish, *Orthagoriscus mola*, which Grassi believes to be a deep-sea species. In the Straits of Messina this fish rarely appears, except in the months from February to September, and the occurrence of *L. brevirostris* is limited to that period."

In the 'Athenæum' for May 29th Canon T. K. Cheyne has contributed a most interesting communication on "Mythic Singing Crocodiles":—"Reading Dr. James's introduction to his 'Apocrypha Inedita,' ii., in the Cambridge 'Texts and Studies,' vol. v., No. 1, I was interested to see that he illustrates the strange flying creatures called Chalkadri, with the feet and tails of lions and the heads of crocodiles and wings like those of angels (a description which also applies to the phœnixes), by Vishnu's bird Garuda. Long ago this same mythical bird was introduced into discussions on the Hebrew cherub, on which Jehovah is said to ride (Ps. xviii. 10), since it is Garuda's chief function to act as the animated chariot of Vishnu. It was new to me that Garuda is also said to have carried Aruna (Vishnu's charioteer) on his back and placed him in front of the sun to prevent it from consuming the world by heat. This gives an interesting parallel to the use of the wings of the phœnix and the Chalkadri, but suggests that Aruna, and not Garuda, is a parallel to these two mythic birds. Garuda still seems to me a distant relative of the cherub. As to the name Chalkadri, I cannot agree with my friend Mr. Charles that it is a transliteration of χαλκύδραι, brazen hydras or serpents. The serpents of Num. xxi. 6 have no solar connection whatever: neither did the old writers attribute any to the brazen serpent. It seems to me that one of the two French scholars to whom Dr. James's volume is dedicated has given the most reasonable view of the name Chalkadri. I will not take up space with recapitulating M. Berger's interesting analogies and arguments, for which see a recent number of the French journal of folk-lore called 'Melusine.' His conclusion is that Chalkadri is a corruption of 'Crocodile,' the letters being mixed up, as so often happens in corruptions. I know that the description only speaks of the head as being that of a crocodile. But the name preceded this description. The only thing which M. Berger has not cleared up is the combination of the phœnix and (*ex hyp.*) the crocodile as attendants on the sun. Can this arise from the fact that the sun-god was identified (among other symbolic animals) with the *bennu* or phœnix and the crocodile (see Brugsch, 'Religion

und Mythologie der alten Aegypter,' pp. 24, 105)? How animals with crocodiles' heads were supposed to sing, I do not know. I presume that the phœnix (which was confused apparently with the swan) sang before it had the misfortune to get a crocodile's head, and that the crocodile learned the secret of the phœnix! The references in the introduction to the dragon are also very interesting. Has Dr. James intentionally omitted mentioning the old Babylonian dragon-myth? It is true this has become sadly distorted. In the act of closing this letter I find in the Palestine Fund 'Quarterly Statement' for July, 1888, a note by Col. Conder on crocodiles in Palestine, in which he points out that these animals are mentioned as 'corcodrils' by Sir John Maundeville; this is very near Chalkadri. He also quotes from a tract of the thirteenth century, showing that crocodiles were then called 'cocatrices.'"

The author of the above has subsequently added the following note to the same journal:—

"Mr. H. Bradley points out to me that the Chalkadri of the Slavonic Enoch would naturally arise out of *calcatrix* (cf. 'Cockatrice' in the 'New English Dictionary'). Calcatrix is a literal translation of ἰχνεύμων; the ichneumon and the crocodile were confounded. This would introduce a fresh element into the strange mingling of animals represented by Chalkadri, and an element entirely inconsistent both with the phœnix and with the crocodile from the point of view of (Egyptian) solar mythology. For the sun-god hated the ichneumon (the symbol of Set) as much as he must have loved the phœnix and the crocodile (his own symbols). That the writer takes the most important part of the Chalkadri (the head) from the crocodile is, however, satisfactory to a mythologist, and we may, perhaps, rest assured now, thanks to M. Berger and Mr. Bradley, that the Chalkadri was in no sense either a serpent or (in spite of its wings) a bird. And if M. Berger pointed in the right direction, the 'New English Dictionary' suggests the probably right conclusion."

At the May meeting of the Norfolk and Norwich Naturalists' Society Mr. Southwell exhibited a remarkably fine example of the old race of Norfolk Great Bustards, which had recently come into his possession, and had not hitherto been recorded. The specimen is a very old male, and is even larger than the fine male killed in 1818, now in the Castle Museum; it was shot at Swaffham early in the present century, probably about 1830, by a Mr. Glasse, Q.C., who then occupied Vere Lodge, Raynham, near Fakenham, Norfolk, as a shooting box. It remained in the possession of the Glasse family until recently sold with the effects of the daughter, Miss Glasse, who died at Bournemouth.

The Galapagos Archipelago was visited by Darwin in 1835; its remarkable zoology, sketched by the 'Voyage of the 'Beagle,' at once aroused the highest interest among naturalists, whilst Darwin's deductions concerning the origin of the Galapagoan fauna are amongst the best known passages in his writings. Since the visit of the 'Beagle,' our knowledge of the avian fauna has been increased by the large collections made by Dr. Habel in 1868, the naturalists of the 'Albatross' in 1888 and 1891, and by Messrs. Baur and Adams in 1891. In 1876 Salvin published his well-known paper "On the Avifauna of the Galapagos Archipelago," which has remained the most important contribution to the subject. Mr. Robert Ridgway has now brought the subject thoroughly up to date by an exhaustive contribution on "Birds of the Galapagos Archipelago," published in the Proc. U.S. Nat. Mus., vol. xix., 1896. During recent years at least one of the indigenous birds has become extinct, the larger Mocking-bird of Charles Island, *Nesominus trifasciatus*, being no longer found. "Others appear to have become extinct on the islands where they were originally found." Forty-six genera of birds have thus far been found in the Galapagos Archipelago, of which six appear to be peculiar, but from a study of the genera alone it is impossible to decide whether the "non-peculiar portion of the Galapagoan avifauna is most nearly related to that of lower Central America or the West Indies." The number of species which have been ascertained to occur in the Galapagos Archipelago is one hundred and five. Even now the study is incomplete, for Mr. Ridgway mentions—"The anomaly of individuals adult as to plumage, but with bills suggesting immaturity, and of others which show exactly the reverse, remains to be explained; and there are other questions which only protracted field-studies by a competent investigator can decide."

Mr Charles A. Witchell, writing in the June issue of 'Knowledge,' describes 'The Swift's Night-flight':—"During June and July, dwellers in places where the Swift abounds may investigate its recently discovered habit of soaring upward at evening and (apparently) spending the night in the sky." It was during the last cloudless Jubilee June (1887) that this extraordinary incident in the life of a diurnal British bird was first noticed in England. Mr. Witchell finds, "It is convenient to watch the Swifts from a somewhat elevated spot, so that they may be kept within view as continuously as possible, since, if they pass out of the field of vision at a distance, it is almost impossible to find them again. It is also desirable to have a support to lean upon, for without this the constant gazing towards the zenith becomes very tiring, especially if field-glasses are used. It is not often that the birds can be seen during the whole of the upward flight; they generally swing around in wide circles for some time, and pass out of

sight towards the horizon, after which the repeated cry 'swee ree' first indicates their return."

Prof. A. E. Verrill, in the Amer. Journ. Sci., January, 1897, from information forwarded to him, recorded the capture of a gigantic Cephalopod on the Florida coast, the body having been described by its discoverer as eighteen feet in length by ten feet in breadth. Prof. Verrill remarked that the proportions given indicated that it might have been a Squid-like form, and not an *Octopus*. Additional facts, however, have since come to hand, and it is found that the remains are not those of a Cephalopod at all. Several large masses of the integument of the creature, preserved fairly well in formalin, have since been forwarded to Prof. Verrill, who has now come to the conclusion "that the mass cast ashore is only a fragment, probably from the head, of some large vertebrate animal covered with a blubber-like layer of great thickness." The record of the giant *Octopus*, or Cephalopod allied to *Octopus*, must therefore be considered as completely refuted.

Lieutenant Peary will start his Arctic voyage of exploration about the 10th of next month, having obtained five years' leave of absence from his duties in the United States Navy for the purpose. He will probably be accompanied by three scientific parties, which will land, according to Mr. Peary's intention, on the coast of Labrador, Baffin Land, and Greenland, for the purpose of studying the botany, glaciology, and ethnology of the northern regions. This year Mr. Peary will go to Whale Sound, on the north-west coast of Greenland, and on returning he will pick up the members of the expedition at the three places indicated. We have little doubt that zoology will also receive due attention.

Two Barbary Wild Sheep and two Tozenburg Goats have been born in the gardens of the Royal Zoological Society of Ireland.

The third edition of 'The Naturalist's Directory' has this year been issued by L. Upcott Gill. This small volume, published at one shilling, is intended for the use of "Students of Natural History, and Collectors of Zoological, Botanical, or Geological Specimens, giving the names and addresses of British and Foreign Naturalists, Natural History Agents, Societies and Field Clubs, Museums, Magazines, &c." Zoologists who possess this small book will find it one of handy reference, and can add to its value by forwarding any corrections and additions, which should be included in the next edition, to the publisher, as the Editor's name is not given.

We recently received the pleasure of a visit from Herr H. Fruhstorfer, of Berlin. The last journey made by this entomological collector was to the Celebes. He is now engaged in working out his Celebesian Rhopalocera, and intends returning to the Malay Archipelago, towards the end of next year, on another entomological expedition.

At a meeting of the Dublin Microscopical Club, held on April 8th, Mr. W. F. Sinclair sent for exhibition two specimens of shagreen. The first was an example of white Asiatic shagreen, such as is used in some English sword-hilts and many Eastern. It was from the skin of *Trygon sephen*, or some closely allied species of Sting-ray. The principal sources of Asiatic shagreen are the Trygons or Sting-rays, and especially *T. sephen*, in which the tuberculated area is usually large in proportion to the total surface; and the tubercles (called in trade the "pearl"), though of various sizes, are arranged so as to present a pretty regular pattern, the lesser filling up the interstices of the greater. Their vertical axis, also, is usually at a right angle to the long axis of the fish, which is important to the sword-cutler, as the hilt covered with such shagreen gives a good "cut-and-thrust grip." The Japanese, the best artists in shagreen, usually arrange the two or three large spinal tubercles of this fish so as still further to improve the grip. *Urogymnus asperrimus* furnishes a skin used for some fancy articles. The *Plectognathi*, especially *Triacanthus* and *Balistes*, furnish a little, of small size and poor quality. Rays, amongst other merits, are much easier to skin than Sharks and Dog-fish; and on the Indian coast, men who never fail to skin *Trygon sephen* can scarcely be persuaded to do so with any other fish, unless it comes handy just when they want some shagreen. The second specimen was identified by Mr. Boulenger as belonging to *Centrophorus granulosus*, a deep-sea Dog-fish, widely distributed and especially abundant about Madeira. This is used for the hilts of the best English regulation swords.